Info

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Dynamics of the map $z^2 + c$

#Wiki/dynamics

$$\begin{aligned} g_c &: \mathbb{C} \to \mathbb{C} \\ z &\mapsto z^2 + c \end{aligned}$$

Definition. Mandelbrot set is defined as

$$\{c \in \mathbb{C} : \lim_{n\to\infty} g_c^n(0) < \infty\}$$

[1]

conjugacy of $z^2 + c$ with the logistic map

> $f_r(x) := rx(1-x)$ and $g_c(z) := z^2 + c$ then if
>
> $$c \mapsto \frac{r}{2} - \frac{r^2}{4};\ \Phi(x) := -rx + \frac{r}{2}$$
>
> then
>
> $$g^n_{c=\frac{r}{2}-\frac{r^2}{4}}(\Phi(x)) = \Phi(f_r^n(x))$$

$$g\left(-rx + \frac{r}{2}\right) = \left(-rx + \frac{r}{2}\right)^2 + \frac{r}{2} - \frac{r^2}{4} = -r^2x + r^2x^2 + \frac{4}{2}$$

$$\Phi(f(x)) = -r(rx(1-x)) + \frac{r}{2} = -r^2x + r^2x^2 + \frac{r}{2}$$

Current note has 0 direct children and 0 total descendants.

- squishy
  - Polynomials
    - Dynamics of the map $z^2 + c$

And it has 17 siblings.

- squishy
  - Polynomials
    - $X^n + Y^n = Z^n$
    - $8X^3 + 4X^2 - 4X - 1$
    - $x^2 + y^2 - 3$
    - Folium of Descartes

      $$X^3 + Y^3 - 3aXY$$

    - $X^3 + Y^3 - a$
    - $3X^3 + 10X^2 + 3 - Y^2$
    - $3X^8 + 10X^4 + 3 - Y^2$
    - $XYZ - 1$
    - Pythagorean triples
    - Bolza curve
    - Irreducible polynomials in $\mathbb{C}[x, y]$
    - Polynomial maps $\mathbb{C}^n \to \mathbb{C}^n$ of degree at most d
    - Chebyshev polynomials of the first kind
    - Logistic map
    - Dynamics of the map $z^2 + c$
    - $\begin{pmatrix} x \\ y \\ y \end{pmatrix} \mapsto \begin{pmatrix} (1+xy)^3 z + y^2(1+xy)(4+3xy) \\ y + 3x(1+xy)^2 z + 3xy^2(4+3xy) \\ 2x - 3x^2y - x^3 z \end{pmatrix}$
    - $(w^2 - 1)^2$

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1. The Mandelbrot set ↩